MATH 1552 Analytic Geometry and Calculus II Lec. 5 Lab. 0 Cr. 5

Effective Date: Summer 2004-2005

Course Description

Prerequisite: MATH 1550. Techniques of integration, parametric equations, polar coordinates, infinite series, vectors in the plane, and introduction to differential equations and partial derivatives. (A grade of "C" or better is required to advance to any higher numbered mathematics course.)

Course Objectives

Students will:

1. Understand the fundamentals of analytic geometry and calculus as presented in the topical outline.
2. Develop critical thinking and problem solving skills.

Procedures to Evaluate these Objectives

1. In-class problems after concept presentation
2. In-class exams
3. Cumulative final exam

Use of Results of Evaluation to Improve the Course

1. Student responses to in-class problems will be used to immediately help clarify any misunderstandings and to later adjust the appropriate course material.
2. All exams will be graded and examined to determine areas of teaching which could use improvement.
3. All evaluation methods will be used to determine the efficacy of the material presentation.

Detailed Topical Outline

1. Integration Techniques
    a. Review of basic Integration Rules
    b. Integration by Parts
    c. Trigonometric Integrals and Trigonometric Substitution
    d. Partial Fractions
    e. Integration by Tables
    f. Integration using L'Hospital's Rule
    g. Improper Integrals
    h. Inverse Trigonometric Functions (Differentiation and Integration)
    i. Hyperbolic Functions

2. Infinite Series
    a. Sequences
    b. Series and Convergence
    c. The Integral Test and p-Series
    d. Comparisons of Series
    e. Alternating Series
    f. The Ratio and Root Tests
    g. Taylor Polynomials and Approximations
    h. Representation of Functions by Power Series
    i. Taylor and Maclaurin Series
3. Conics, Parametric Equations, and Polar Coordinates
    a. Parabolas, Ellipses, and Hyperbolas
    b. Plane Curves and Parametric Equations
    c. Parametric form of the Derivative
    d. Arc Length in Parametric Form
    e. Surface Area in Parametric Form
    f. Polar Coordinates and Rectangular Coordinates (Conversion Theorem)
    g. Graphs of Polar Equations
    h. Area and Arc Length in Polar Coordinates
4. Vectors and Curves
    a. Vector Coordinates
    b. Vector Addition and Scalar Multiplication
    c. The Dot Product of Vectors
    d. Vector-Valued Functions where the Components are Real-Value Functions of Parameter t
    e. Differentiation and Integration of Vector-Valued Functions
    f. Velocity Vectors and Acceleration Vectors
    g. Tangent Vectors and Normal Vectors
    h. Arc Length and Curvature